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PLANETARY PHENOMENA FOR JULY AND AUGUST,
1896.

BY PROFESSOR MALCOLM MCNEILL.

JULY, 1896.

The Earth is in aphelion on July 3d, at 2 P. M., P. S. T.

Mercury is at greatest west elongation on July 3d, and remains a morning star until July 31st, when it comes to superior conjunction with the Sun. For the first twenty days of the month, it rises at least an hour before the Sun, and may be seen under good weather conditions. On the afternoon of July 13th, it passes seven minutes south of the third-magnitude star μ *Geminorum*, and, on the morning of July 29th, it is almost in exact coincidence with the fifth-magnitude star η *Cancrī*. At that time, however, it is too near the Sun to be seen.

Venus is very close to the Sun throughout the month, passing superior conjunction with the Sun on the morning of July 9th, and changing from a morning to an evening star. It does not move very far from the Sun during the month, and at the end sets less than half an hour later. It is in perihelion on the morning of July 23d.

Mars, at the end of the month, rises before midnight. During the month it moves about twenty degrees east and seven degrees north from the western to the eastern part of the constellation *Aries*. It is beginning to draw nearer to the Earth somewhat rapidly, and to gain materially in brightness, but is still nearly twice as far away as it will be at its opposition in December.

Jupiter is too near the Sun for good observation, and, by the end of the month, it sets only half an hour later. During the month, it moves seven degrees eastward and southward in the constellation *Cancer*.

Saturn is in fair position in the southwestern sky in the evening. It is nearly stationary among the stars, moving a few minutes westward, and then turning and moving a few minutes eastward. It is, throughout the month, about two degrees north and a little west of the third-magnitude star α *Libræ*. The apparent minor axis of the outside ring is about seven-eighths of the diameter of the planet.

Uranus is near *Saturn*, crossing the meridian about half an hour later. It is about seven degrees east and four degrees south of *Saturn*. No conspicuous star is very near; but the fifth-magnitude ζ *Libræ* is two degrees east and one degree north of the planet. The planet itself is sixth-magnitude, and may be seen on a clear, moonless night, if one has reasonably sharp eyesight.

Neptune is a morning star, in the eastern part of the constellation *Taurus*. It is too faint to be seen without a telescope.

AUGUST, 1896.

Eclipses. There will be two eclipses during the month. The first is a *total eclipse of the Sun*, on August 9th. The line of totality begins in the North Atlantic Ocean, touches the continent in the extreme northern part of Norway, then across the Arctic Ocean through Nova Zembla, into and across Siberia southeast to the coast, and through the island Yezo, ending in the Pacific Ocean about longitude 180° , latitude 20° . The extreme duration of totality is considerably less than three minutes. The stations most convenient of access are in Norway, where the duration of totality is less than two minutes, and on the island of Yezo, where the duration is about two and one-half minutes.

The second eclipse will be a *partial eclipse of the Moon*, on the night of August 22d-23d, and will be visible in the Western Hemisphere. The Moon enters the shadow at 9^h 24^m P. M., P. S. T., and leaves the shadow at 12^h 30^m A. M. The maximum obscuration, which occurs at 10^h 57^m P. M., is about three-quarters of the Moon's diameter.

Occultations. The Moon will again pass over the *Pleiades* on the early morning of August 3d, and a number of occultations may be seen in almost any part of the country. The immersions will be at the bright limb, and the emersions at the dark limb.

Mercury is an evening star, but is too close to the Sun to be easily seen, except, perhaps, in the latter part of the month, when it sets about an hour later, and may possibly be seen in clear weather. It will come to greatest eastern elongation on September 13th.

Venus is also an evening star, but is still very close to the Sun. By the end of the month it sets only forty minutes later. As it

is also at nearly its greatest distance from us, it will not be a very conspicuous object.

Mars is rising earlier, at 10^h 35^m on August 31st, and is getting brighter. At the end of the month, its distance from us is about equal to the Earth's distance from the Sun. During the month, it moves about nineteen degrees eastward and four degrees northward, in the constellation *Taurus*, passing between the *Pleiades* and the *Hyades* about August 15th.

Jupiter is too near the Sun to be seen. It passes conjunction with the Sun and changes from an evening to a morning star on the morning of August 12th.

Saturn is still an evening star, but is setting earlier each night; by the end of the month, it sets a little after nine. It is in the constellation *Libra*, north and a little east of the third magnitude star α *Libræ*. During the month, it moves about one degree eastward. The apparent opening of the rings is a trifle greater than during July.

Uranus occupies about the same position relative to *Saturn* as during July. Its motion among the stars is about half as great as that of *Saturn*, and is in the same general direction, eastward. At the end of the month, it is in about the same position it occupied on July 1st. The whole motion during the month is about half a degree, the apparent diameter of the Moon.

Neptune remains in about the same position in *Taurus*. By the end of the month, it rises before midnight.

EXPLANATION OF THE TABLES.

The phases of the Moon are given in Pacific Standard time. In the tables for Sun and planets, the second and third columns give the Right Ascension and Declination for Greenwich noon. The fifth column gives the local mean time for transit over the Greenwich meridian. To find the local mean time of transit for any other meridian, the time given in the table must be corrected by adding or subtracting the change per day, multiplied by the fraction whose numerator is the longitude from Greenwich in hours, and whose denominator is 24. This correction is seldom much more than 1^m. To find the standard time for the phenomenon, correct the local mean time by *adding* the difference between standard and local time if the place is west of the standard meridian, and *subtracting* if east. The same rules apply

to the fourth and sixth columns, which give the local mean times of rising and setting for the meridian of Greenwich. They are roughly computed for Lat. 40° , with the noon Declination and time of meridian transit, and are intended as only a rough guide. They may be in error by a minute or two for the given latitude, and for latitudes differing much from 40° they may be several minutes out.

PHASES OF THE MOON, P. S. T.

		H. M.
Last Quarter,	July 2,	5 23 P. M.
New Moon,	July 10,	11 35 A. M.
First Quarter,	July 17,	8 4 A. M.
Full Moon,	July 24,	9 45 A. M.

THE SUN.

1896.	R. A. H. M.	Declination. ° '	Rises. H. M.	Transits. H. M.	Sets. H. M.
July 1.	6 44	+ 23 4	4 41 A. M.	12 4 P. M.	7 27 P. M.
11.	7 25	+ 22 1	4 46	12 5	7 24
21.	8 5	+ 20 20	4 54	12 6	7 18
31.	8 45	+ 18 6	5 3	12 6	7 9

MERCURY.

July 1.	5 14	+ 19 31	3 25 A. M.	10 34 A. M.	5 43 P. M.
11.	6 1	+ 21 59	3 22	10 41	6 0
21.	7 17	+ 22 52	3 55	11 18	6 41
31.	8 45	+ 19 48	4 57	12 7 P. M.	7 17

VENUS.

July 1.	6 34	+ 23 41	4 27 A. M.	11 54 A. M.	7 21 P. M.
11.	7 28	+ 22 45	4 46	12 8 P. M.	7 30
21.	8 20	+ 20 42	5 7	12 21	7 35
31.	9 11	+ 17 40	5 28	12 32	7 34

MARS.

July 1.	1 53	+ 9 50	12 39 A. M.	7 13 A. M.	1 47 P. M.
11.	2 20	+ 12 14	12 19	7 1	1 43
21.	2 47	+ 14 25	11 58 P. M.	6 48	1 38
31.	3 13	+ 16 21	11 38	6 35	1 32

JUPITER.

1896.	R. A. H. M.	Declination. ° ' "	Rises. H. M.	Transits. H. M.	Sets. H. M.
July 1.	8 55	+ 18 6	7 12 A.M.	2 15 P.M.	9 18 P.M.
11.	9 3	+ 17 32	6 43	1 44	8 45
21.	9 12	+ 16 55	6 14	1 13	8 12
31.	9 21	+ 16 17	5 45	12 42	7 39

SATURN.

July 1.	14 44	— 13 20	2 48 P.M.	8 2 P.M.	1 16 A.M.
11.	14 43	— 13 20	2 8	7 22	12 36
21.	14 43	— 13 23	1 29	6 43	11 57 P.M.
31.	14 44	— 13 28	12 50	6 4	11 18

URANUS.

July 1.	15 14	— 17 41	3 34 P.M.	8 32 P.M.	1 30 A.M.
11.	15 13	— 17 38	2 54	7 52	12 50
21.	15 12	— 17 37	2 14	7 12	12 10
31.	15 12	— 17 37	1 34	6 32	11 30 P.M.

NEPTUNE.

July 1.	5 11	+ 21 36	3 14 A.M.	10 31 A.M.	5 50 P.M.
11.	5 12	+ 21 37	2 36	9 53	5 10
21.	5 14	+ 21 39	1 58	9 15	4 32
31.	5 15	+ 21 40	1 20	8 37	3 54

PHASES OF THE MOON, P. S. T.

		H. M.
Last Quarter,	August 1,	10 34 A. M.
New Moon,	August 8,	9 2 P. M.
First Quarter,	August 15,	1 2 P. M.
Full Moon,	August 22,	11 4 P. M.
Last Quarter,	August 31,	2 55 A. M.

THE SUN.

1896.	R. A. H. M.	Declination. ° ' "	Rises. H. M.	Transits. H. M.	Sets. H. M.
Aug. 1.	8 48	+ 17 50	5 4 A.M.	12 6 P.M.	7 8 P.M.
11.	9 27	+ 15 4	5 13	12 5	6 57
21.	10 4	+ 11 52	5 22	12 3	6 44
31.	10 41	+ 8 23	5 31	12 0 M.	6 29

MERCURY.

1896.	R. A. H. M.	Declination. ° '	Rises. H. M.	Transits. H. M.	Sets. H. M.
Aug. 1.	8 54	+ 19 17	5 3 A.M.	12 11 P. M.	7 19 P. M.
11.	10 11	+ 12 51	6 5	12 50	7 35
21.	11 14	+ 5 29	6 55	1 13	7 31
31.	12 7	+ 1 39	7 21	1 26	7 31

VENUS.

Aug. 1.	9 16	+ 17 19	5 33 A.M.	12 33 P. M.	7 33 P. M.
11.	10 4	+ 13 24	5 56	12 42	7 28
21.	10 51	+ 8 52	6 19	12 50	7 21
31.	11 37	+ 3 57	6 43	12 56	7 9

MARS.

Aug. 1.	3 15	+ 16 32	11 37 P. M.	6 35 A. M.	1 33 P. M.
11.	3 41	+ 18 11	11 16	6 20	1 24
21.	4 6	+ 19 34	10 56	6 5	1 14
31.	4 29	+ 20 42	10 35	5 49	1 3

JUPITER.

Aug. 1.	9 21	+ 16 13	5 42 A. M.	12 39 P. M.	7 36 P. M.
11.	9 30	+ 15 32	5 14	12 8	7 2
21.	9 39	+ 14 51	4 47	12 38 A. M.	6 29
31.	9 47	+ 14 9	4 19	11 7	6 55

SATURN.

Aug. 1.	14 44	- 13 29	12 46 P. M.	6 0 P. M.	11 14 P. M.
11.	14 45	- 13 38	12 9	5 22	10 35
21.	14 47	- 13 49	11 33 A. M.	4 45	9 57
31.	14 49	- 14 3	10 56	4 8	9 20

URANUS.

Aug. 1.	15 12	- 17 37	1 30 P. M.	6 29 P. M.	11 28 P. M.
11.	15 13	- 17 38	12 51	5 50	10 49
21.	15 13	- 17 41	12 13	5 11	10 9
31.	15 14	- 17 45	11 36 A. M.	4 33	9 30

NEPTUNE.

1896.	R. A.		Declination.		Rises.		Transits.		Sets.	
	H.	M.	°	'	H.	M.	H.	M.	H.	M.
Aug. 1.	5	15	+ 21	40	1	15 A.M.	8	33 A.M.	3	51 P.M.
11.	5	16	+ 21	41	12	37	7	55	3	13
21.	5	17	+ 21	41	11	58 P.M.	7	16	2	34
31.	5	18	+ 21	42	11	20	6	38	1	56

(TWENTY-SECOND) AWARD OF THE DONOHUE
COMET-MEDAL.

The Comet-Medal of the Astronomical Society of the Pacific has been awarded to Mr. C. D. PERRINE, Assistant Astronomer in the LICK Observatory, for his discovery of an unexpected comet on February 15, 1896.

The Committee on the Comet-Medal,

EDWARD S. HOLDEN,
J. M. SCHAEBERLE,
W. W. CAMPBELL.

April 15, 1896.

REPORTED VOLCANIC ERUPTIONS.

FROM RECORD IN OFFICE OF FREDERICK G. PLUMMER, C. E.,
TACOMA, WASH.

TACOMA, Wash., March 13, 1896.

PROF. E. S. HOLDEN, Director LICK Observatory, Cal.

Sir:—The matter contained in my letter of March 3d also applies to the table of reported volcanic eruptions submitted herewith.

There can be no doubt that many eruptions are reported which might be contradicted if examination were possible. For example, the reports of the eruption and change in the summit of Mount Tacoma from November 21 to December 25, 1894, filled many columns of the press dispatches, and possibly were intended for that purpose. December 25th was the most perfect day for observation, and, with my 6½-inch refractor, the crater-